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INSECTS PRESENT IN WESTERN WHITE PINE AFFECTED BY POLE BLIGHT

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Increasing losses have been observed in the pole-sized stands of western white pine. For a number of years prior to the initiation of this project, an unknown malady was attacking apparently healthy trees and causing their death within a few years. Tentatively, the name "pole blight" was given to this destructive agency. Stands so affected had been reported from a number of forests. An inventory of the extent of pole blight showed it to be causing increasing loss on the Kootenai, Cabinet, Kaniksu, Coeur d'Alene, and St. Joe National Forests. The threat this apparently rapidly spreading malady imposed on the future of western white pine in the range of that timber species, indicated the urgent need for determining the cause of these losses and developing a remedy for them. Coordinating federal and state agencies began an intensive study of the problem. They soon reported the presence of insects in much of the pole blight affected material and suggested the possibility that insects might have some bearing on the problem. Although it was realized that intensive work on the relationship of insects to the problem could not be done effectively until the cause of pole blight was learned, a preliminary study was projected in 1949 by the Coeur d'Alene Laboratory, having for its objective the determination of insects associated with pole blight-affected trees.

Collections were to be made from all parts of western white pine trees, from bark surfaces, cambium, and wood of limbs, boles, logs, stumps and roots. Foliage and twigs were to be examined for defoliating, mining and boring insects. Areas where collections were to be made included both pole blight infected and uninfected trees where that malady was present. In addition insects were to be collected where no pole blight had been found. Collections on the latter areas were to serve as a check on the possible presence of any insect on pole blight areas which might be absent on non-infected areas. Other classes of life than insects, that might have some relationship to pole blight, were to be collected also.

In the material collected, all parts of the trees were represented except limbs, twigs, and needles. No insects were noted on the approximately twenty trees whose crowns were inspected. In the 23 days of examination and collection in 1949, at least 1,000 trees were examined, many of them a number of times during the season. Repeated inspections were for the purpose of sampling the seasonal variation in insect species. During

the season of 1949, 131 collections were submitted to the Washington office for identification. Returns fell into the following divisions.

Fauna reported	86
Duplications of the above	51(1)

(1) In each of six collections two species were present

Duplications were of the same insects from various kinds of material, such as boles, logs, stumps and roots, or from different localities. In many cases no species name was given the submitted material because it was in immature stages of development. Identification of such material to species is extremely difficult and at times impossible. Unidentified material consisted chiefly of millipedes, centipedes, etc. collected chiefly from the ground. Collection emphasis was placed on trees in various stages of pole blight infection. However, uninfected trees on areas of infection and trees from areas free of infection were well represented in material collected. In the following tabulation the number of trees and portions of trees from which collections were made, are given.

Trees From Which Insects Were Collected
1949

	In Areas of					
	No Pole Blight		Pole Blight			
			Infection Absent		Infection Present	
Portion of tree	Green	Dead	Green	Dead	Green	Dead
Bole	18	6	6	2	12	10
Stump	2	3	--	--	6	4
Roots	2	5	3	2	6	2
Root Soil	3	--	2	--	5	--
Totals	25	14	11	4	29	16
Grand Total		39		15		45

About forty percent of the time was spent in collecting from roots and root soil. Excavating a root system for collecting purposes is laborious, exacting and time-consuming. Much of it must be done with the hands and small hand tools. Return in number of fauna collected for effort expended is quite low.

A comparatively small percentage of trees in the early stages of pole blight infection were found to have insects on the bark surface, cambium, stump or root collar. Trees in more advanced stages of infection furnished a much larger percentage of the collected material. This would seem to indicate that insects found in the portions of the tree above ground were secondary, and that pole blight was primary in attack. Although the writer realizes his opinion is based on meager data, he feels that root insects seem to offer the most fertile field in considering insects as possible vectors of pole blight. Most of the fauna collected in more than one locality were found on both pole blight and non-pole blight areas. For the few exceptions, where duplications were limited to pole blight areas, the numbers of such occurrences were too few to indicate any relationship of insects to pole blight.

The fauna collected from western white pine in 1949 cannot be considered as complete. It is the writer's belief that further collecting would yield many more species. Especially may this be true for defoliators, twig, branch, and root fauna, and the symbionts associated with them. Furthermore, to be representative, collecting should be conducted during the entire season of insect activity. Few collections have been made early in the season.

Fauna collected in 1949 was distributed as follows among the various orders:

Pseudoscropionida	1
Diplopoda	3
Chilopoda	7
Collembola	1
Hemiptera	6
Hymenoptera	6
Diptera	9
Coleoptera	55

This project has served at least one valuable purpose, which is to indicate the numerous fauna associated with western white pine. The place that they may have in the incidence and spread of pole blight was not obtained from this study. However, when the cause of pole blight is determined, what has been learned from this project may serve to indicate the starting point for establishing whatever relationship may exist between the causative agency and insects.

It is felt that no further collection and study on this project should be attempted until the agency responsible for pole blight has been determined. The study of the cambium fed upon by aphis during a widespread outbreak of that insect in 1949 also should be deferred until the future. Bark surfaces on which feeding occurred have been marked on different plots. Microscopic examinations of such surfaces have so far failed to show any effect of the feeding. However, there is a possibility that such areas will become necrotic at some future time.

A list of the fauna found on this project is appended.

INSECTS ASSOCIATED WITH "POLE BLIGHT" INFESTED WESTERN WHITE PINE

Species	"Pole Blight" Free Collected From	"Pole Blight" Zone Uninfected Tree Collected From	"Pole Blight" Zone Infected Tree Collected From
Lycoria sp.			Root cambium
Cinara sp.	Bole bark surface (2)		
	Soil	Bole bark surface	
Aphidius sp.	Bole bark surface	Bole bark surface	
Neomyda sp.	Bole bark surface		
Prob. Diden fasciata (Macq.)	Bole bark surface		
Prob. Diden sp.	Bole bark surface		
Baccha sp.	Bole bark surface (2)		
Chelodesmidae (new genus)			In ground (2)
	Stump cambium (2) - Base cambium		
Hylurgops rugipennis (Mann.)	Log cambium (2) - Bole cambium (2)	Bole of windfall	Bole cambium - Base cambium (2)
Dryocetes sp. prob. affaber (Mann.)			Bole cambium
Trypodendron sp.?			Bole cambium
Ips sp. probably Plastographus (Lec.)	Stump cambium		
Hylurgops subcostulatus (Mann.)	Log cambium		Bole cambium (2)
	Stump cambium		Root collar cambium (2)
Colaenopsidae - Genus not seen before			Bole cambium
Dendroctonus valens Lec.			Base cambium
	Stump cambium		
Pissodes cupriei Hopk.	Root cambium and wood (2)		Base cambium (2)
Cossonus sp.			Base cambium
Rhyncolus brunneus Mann.			Base cambium
			Bole cambium
Hylurgops sp.			Base cambium (2)

Pityogenes fossifrons (Lec.)	Bole cambium	Bole cambium	Base cambium
			Base cambium
Ips latidens (Lec.)			Bole cambium (2)
Paromalus (Isolomalus) teres (Lec.)			Bole cambium
Ginara chamberlini (Knowlton)		Bole bark surface	
Polygraphus sp.		Bole cambium	
Orthotomicus vicinus (Lec.)	Log cambium		Bole cambium
Collembola			Stump cambium
Ladius sp.		Root cambium	
Arhopalus (Criocephalus) uteanus (Csy.)		Root cambium	Root cambium (2)
Chilopoda		Root cambium	
Rhizophagus sp.	Basal cambium	Bole cambium	
Ips vancouveri Sw.			Bole cambium
Epurasa sp.			Bole cambium
Prociphilus bumeliae (Schrank)	Root surface		
Ampedus ater LeC.?	Stump surface		
Dircaea sp.?	Log cambium		
Platysoma punctiger	Stump cambium		
Nedeterus sp.?	Log cambium (2)		
Thanasimus sp.	Log cambium		
Histeridae Genus unknown	Log cambium		
Plegaderus sp.	Log cambium		
Coeloides dendroctoni Cush.	Log bark surface		
Symphoromyia atripes Bigot			Bark surface
Trichalophus sp.		Root cambium	
	Stump cambium		
Carabidae	Soil around roots	Soil around roots	Soil around roots
Probably Limonius sp.	Soil around roots		
Probably Ellychnia or Pyropyga sp.	Soil around roots		
Lasius niger var. neoniger Emery	Root aphis honeydew		
Gnathomerium xenoporus (Chamberlin)	Soil around roots		

Saiulus setifer Chamb.	Soil around roots	
Montaphe ? sp.	Soil around roots	
Parsiulus sp.	Soil around roots	
Itonididae - Genus & species?	Bole cambium	
Cabius sp.		Soil around roots (2)
Pokabius utahensis (Chamb.)		Soil around roots
Pseudoscorpionidae		Soil around roots
Araneida		Soil around roots
Melictus rubicundus (Christ)		Soil around roots
Camponotus herculeanus (L.)		Soil around roots
Macrosteles divisus (Uhler)	With root aphis colony	
Isolomalus maneus		Bole cambium
Ctenicera sp.		Root cambium
Bothropolys sp.	Root cambium	
Monochamus maculosus Lec.		Log bark surface
Leptura obliter ata Hald.	Log bark surface	
Cylindrocopturus sp. prob. de leoni Bach.	Bole cambium	
Syrphoctonus agilis (Cress.)		Visitor to bark surface
Acanthocinus obliguus Lec.	Bole bark surface	
Phytocoris sp.	Bole bark surface	
Anoplerda crassipes Lec.		Bole bark surface
Monochamus notatus Drury		Bole bark surface (2)
Metasyrphus sp.		Bole bark surface - feeding on aphids
Staphylinus sp.		Bole bark surface
Conoessus piniphilus Beh.	Stump cambium (2)	
Paobius sp.	Stump cambium	
Cucujus sp.	Stump cambium	
Xylophagus sp.	Stump cambium	
Enoclerus sp.	Stump cambium	
Leptalis (near)	Stump cambium	

Enocleras moestus (Klug)		Bole cambium
Hylurgops lecontei Sw.		Bole cambium
Rhyncolus sp.		Bole cambium
Hypophloeus sp.		Bole cambium
	With aphis colonies on	
Aphidius n. sp.	bole cambium.	
Geophilus mordax Meinert		Root bark surface
Dryocetes affaber (Mann.)		Bole cambium
Prociphilus sp. (Not recognized)	Root bark surface	